
1989 ARIZONA COPPER PRODUCTION

Includes Tables I, II, III, IV, VI, VII, & VIII from "The Primary
Copper Industry of Arizona in 1989" in press

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**This is a preliminary report,
subject to technical and
editorial revision.**

TABLE I
COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES
1989

COMPANY/MINE	TONS COPPER ORE MINED	TONS COPPER ORE MILLED	POUNDS RECOVERABLE COPPER	POUNDS RECOVERABLE MOLYBDENUM	TONS WASTE/OVERBURDEN REMOVED
ARIMETCO					
Emerald Isle In Situ/Cementation			48,000		
Total			48,000		

ASARCO, INC.					
Mission Unit					
Sulphide	9,927,000	9,927,000	117,243,000		14,016,000
San Xavier ¹	3,072,000	3,072,000	26,765,000		20,655,000
Ray Unit					
Sulphide	9,524,000	9,524,000	153,879,000		25,412,000
Oxide	5,311,000				
Heap Leach/SX-EW			58,071,000		
Dump Leach/SX-EW			21,862,000		
Silver Bell Unit					
Dump Leach/Cementation			10,017,000		
Total	27,834,000	22,523,000	387,837,000		60,083,000

¹ San Xavier ore concentrated at Mission Complex.

(continued)

TABLE 1 (CONT'D)
COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES
1988

COMPANY/MINE	COPPER ORE MINED	COPPER ORE MILLED	RECOVERABLE COPPER	RECOVERABLE MOLYBDENUM	WASTE/OVERBURDEN REMOVED
<u>CYPRUS MINERALS CO.</u>					
Bagdad					
Sulphide	22,844,000	22,381,000	176,372,000	8,697,000	28,095,000
Dump Leach/SX-EW			22,262,000		
Casa Grande					
In Situ/SX-EW			5,000,000		
Miami					
Oxide	20,115,000				19,241,000
Heap Leach/SX-EW ¹	124,179,000				
Dump Leach/Cementation			188,000		
Mineral Park					
In Situ/Cementation			1,526,000		
Dump Leach/Cementation			1,812,000		
Sierrita					
Sulphide	32,190,000	32,190,000	151,800,000	14,900,000	25,409,000
Dump Leach/SX-EW ²			8,400,000		
Twin Buttes					
Sulphide	2,814,000	2,814,000	67,322,000		23,563,000
Oxide			18,800,000		
Agitation Leach/SX-EW	1,216,000				
Total	79,179,000	57,385,000	577,661,000	23,597,000	96,308,000

1. Although some of this production is from old dumps, it is undifferentiated and is reported as heap leach.

2 Sulphide ore is concentrated at Sierrita Concentrator.

(continued)

TABLE 1 (CONT'D)
COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES
1989

COMPANY/MINE	TONS COPPER ORE MINED	TONS COPPER ORE MILLED	POUNDS RECOVERABLE COPPER	POUNDS RECOVERABLE MOLYBDENUM	TONS WASTE/OVERBURDEN REMOVED
<u>KOCIDE MINING CORP.</u>					
Van Dyke ¹ In Situ/Cementation			654,000		
Total			654,000		
 <i>1. Operation permanently suspended in October 1989.</i>					

<u>MAGMA COPPER CO.</u>					
Pinto Valley Division					
Sulphide	21,229,000	21,610,000	162,550,000	1,268,000	32,480,000
Dump Leach/SX-EW			10,214,000		
Miami					
In Situ			8,882,000		
No. 2 Tailings	1,349,000		1,917,000		
San Manuel Division					
Underground-Sulphide	16,582,000	16,672,000	180,793,000	3,039,000	
Open Pit-Sulphide	71,000	71,000	976,000		23,201,000
-Oxide	9,417,000				
Heap Leach/SX-EW			60,143,000		
In Situ/SX-EW			8,712,000		
Total	48,648,000	38,353,000	434,187,000	4,307,000	55,681,000

(continued)

TABLE 1 (CONT'D)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZNA COPPER MINES
1989

COMPANY/MINE	TONS COPPER ORE MINED	TONS COPPER ORE MILLED	POUNDS RECOVERABLE COPPER	POUNDS RECOVERABLE MOLYBDENUM	TONS WASTE/OVERBURDEN REMOVED
<u>PHELPS DODGE CORP.</u>					
Copper Queen Branch Dump Leach/Cementation			4,762,000		
Morenci Branch ¹ Sulphide	41,023,000	40,659,000	471,412,000	1,891,000	49,869,000
Dump Leach/SX-EW			126,892,000		
Dump Leach/Cementation			6,329,000		
Total	41,023,000	40,659,000	609,395,000	1,891,000	49,869,000

1. Includes Sumitomo's 15%.

Totals					
Sulphide	159,276,000	158,920,000	1,509,112,000	29,795,000	219,499,000
Oxide (Leach)	37,408,000				43,442,000
Heap Leach/SX-EW			242,393,000		
Dump Leach/SX-EW			189,630,000		
Dump Leach/Cementation			23,108,000		
In Situ/SX-EW			22,594,000		
In Situ/Cementation			2,228,000		
Agitation Leach/SX-EW			20,717,000		
Sub Total Leached			500,670,000		
SX-EW			475,334,000		
Cementation			25,336,000		
GRAND TOTAL	196,684,000	158,920,000	2,009,782,000	29,795,000	261,941,000

TABLE 11
ARIZONA LEACH COPPER PRODUCTION (1

(Thousand Pounds)

<u>MINE OPERATION</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
ARIMETCO										
Emerald Isle	--	--	--	--	--	--	--	--	--	48
Johnson (2)	10,302	10,693	9,702	--	8,803	6,200	--	--	--	--
ASARCO INCORPORATED										
Silver Bell	4,423	7,950	8,687	10,374	9,152	8,800	6,814	12,800	8,660	10,017
Ray (3)	25,875	25,788	22,420	20,033	20,457	23,706	56,639	68,543	76,966	79,933
CYPRUS MINES CORP.										
Bagdad	12,668	13,244	13,173	13,282	14	14,259	13,958	16,470	19,100	22,262
Bluebird (4)	13,017	13,328	NR	--	--	--	--	--	--	--
Casa Grande (5)	--	26,071	45,611	3,244	15,401	13,514	7,100	4,145	4,300	5,000
Miami (6)	28,958	50,532	50,000	78,988	79,549	85,136	98,747	105,555	115,293	124,367
Mineral Park (7)	3,690	4,194	3,191	3,101	2,718	3,798	4,251	4,405	4,500	3,338
Ox Hide (6)	1,015	761	1,572	--	--	--	--	--	--	--
Sierrita/Esperanza (7)	9,991	11,566	9,354	6,367	8,500	10,000	8,770	7,943	8,556	8,400
Twin Buttes (8)	63,719	67,922	60,796	50,649	50,239	19,824	--	--	--	18,800
KOCIDE MINING CORP.										
Van Dyke	--	--	--	--	--	--	--	--	67	654
MAGMA COPPER CO.										
Copper Cities	3,984	3,622	2,046	--	--	--	--	--	--	--
Pinto Valley/Miami	11,184	15,736	26,958	24,632	25,602	23,947	22,252	22,724	23,413	21,013
San Manuel (9)	--	--	--	--	--	--	21,923	51,278	62,956	68,855
PHELPS DODGE CORPORATION										
Copper Queen Branch	6,052	4,600	4,545	5,200	3,493	4,144	3,454	2,730	2,700	4,762
Morenci Branch	86,840	96,090	75,735	69,158	60,312	53,228	56,261	45,249	108,426	133,221
New Cornelia Branch	--	--	661	--	920	402	--	--	--	--

ARIZONA LEACH COPPER PRODUCTION (CONT'D)

(Thousand Pounds)

<u>MINE OPERATION</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
RANCHERS										
Old Reliable	1,128	149	--	--	--	--	--	--	--	--
TOTALS	282,846	352,246	334,451	285,028	285,160	266,958	300,169	341,842	434,937	500,670
PERCENT OF PRIMARY COPPER PRODUCED (10)	16.4	15.0	19.6	18.8	18.0	15.0	17.1	19.8	23.1	24.9

- (1) Copper recovered by precipitation or by solvent extraction from material dump, heap, vat or in situ leached.
- (2) Arimetco acquired Johnson Camp from Cyprus in August 1989.
- (3) Asarco purchased Ray Unit from Kennecott, November 18, 1986.
- (4) Operated by Ranchers, became part of Inspiration Area Mines, July, 1984 and Cyprus Miami, July, 1988.
- (5) Hecla Lakeshore through 3/31/79; Noranda Lakeshore through 6/31/87; Now Cyprus Casa Grande.
- (6) Sold by Inspiration to Cyprus, July 1, 1988.
- (7) Cyprus purchased Sierrita/Esperanza and Mineral Park from Duval, April 1, 1986.
- (8) Operated by ANAMAX. Acquired by Cyprus, March, 1988.
- (9) Open Pit, Heap Leach, SX-EW start-up in spring of 1986. Some In Situ test production.
- (10) Leach Copper compared to total copper produced as reported in this report, Table I.

Source: Arizona Department of Mines and Mineral Resources; This report, Table I-II

TABLE III
RANK OF ARIZONA'S COPPER COMPANIES
BY PRODUCTION OF COPPER AND MOLYBDENUM
1989

<u>Copper</u>			<u>Molybdenum</u>		
<u>Rank</u>	<u>Company</u>	<u>% of AZ Production</u>	<u>Rank</u>	<u>Company</u>	<u>% of AZ Production</u>
1	Phelps Dodge Corp. 609,395,000	30.3	1	Cyprus Minerals Co. 23,597,000	79.2
2	Cyprus Minerals Co. 577,661,000	28.8	2	Magma Copper Co. 4,307,000	14.5
3	Magma Copper Co. 434,187,000	21.6	3	Phelps Dodge Corp. 1,891,000	6.3
4	Asarco Inc. 387,837,000	19.3			
5	Kocide Mining Corp. 654,000	0.0			
6	Arimetco 48,000	0.0			
TOTAL	2,009,782,000	<u>100.0</u>		29,795,000	<u>100.0</u>

TABLE IV
RANK OF ARIZONA'S COPPER MINES
BY PRODUCTION OF COPPER AND MOLYBDENUM
1989

<u>Copper</u>			<u>Molybdenum</u>		
<u>Rank</u>	<u>Mine/Company</u> <u>Copper Produced, lb.</u>	<u>% of AZ</u> <u>Production</u>	<u>Rank</u>	<u>Mine/Company</u> <u>Moly Produced, lb.</u>	<u>% of AZ</u> <u>Production</u>
1	Morenci/Phelps Dodge 604,633,000	30.1	1	Sierrita, Twin Buttes/ Cyprus 14,900,000	50.0
2	San Manuel/Magma 250,624,000	12.5	2	Bagdad/Cyprus 8,697,000	29.2
3	Sierrita, Twin Buttes/ Cyprus 246,322,000	12.3	3	San Manuel/Magma 3,039,000	10.2
4	Ray/Asarco 233,812,000	11.6	4	Morenci/Phelps Dodge 1,891,000	6.3
5	Bagdad/Cyprus 198,634,000	9.9	5	Pinto Valley/Magma 1,268,000	4.3
6	Pinto Valley, Miami/Magma 183,563,000	9.1			
7	Mission/Asarco 144,008,000	7.2			
8	Miami/Cyprus 124,367,000	6.2			
9	Silver Bell/Asarco 10,017,000	0.5			
10	Mineral Park/Cyprus 3,338,000	0.2			
11	Casa Grande/Cyprus 5,000,000	0.2			
12	Copper Queen/Phelps Dodge 4,762,000	0.2			
13	Van Dyke/Kocide 654,000	0.0			
14	Emerald Isle/Arimetco 48,000	0.0			
Total	2,009,782,000	100.00		29,795,000	100.00

TABLE VI
AVERAGE COPPER CONTENT OF ORE PRODUCED AT ARIZONA COPPER MINES
(Percent Total Copper)

<u>MINE OPERATION</u>		<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
ASARCO INCORPORATED											
Mission (1	Sulphide	0.75	0.75	(0.75)	(0.75)	(0.75)	0.65	0.70	0.67	0.73	0.70
Pima (1	Sulphide	0.49	0.49	0.48	--	--	--	--	--	--	--
Ray Unit 2 (3	Sulphide	0.91	0.97	0.80	1.19	1.13	0.99	0.99	0.89	1.00	0.97
	Oxide	--	--	--	--	--	1.17	1.23	1.15	1.11	1.13
	(Silicate)										
San Xavier (1	Sulphide	0.65	0.65	(0.65)	(0.51)	(0.51)	--	--	--	--	0.55
CYPRUS MINES CORPORATION											
Bagdad	Sulphide	0.50	0.50	0.50	0.50	0.45	0.44	0.45	0.48	0.45	0.49
Bluebird (4	Oxide	0.40	0.40	--	--	--	--	--	--	--	--
Christmas (OP) (5	Sulphide	0.73	0.62	--	--	--	--	--	--	--	--
Esperanza (6	Sulphide	0.32	0.29	0.29	--	--	--	--	--	--	--
Johnson	Oxide	0.40	0.40	0.40	0.40	0.71	--	--	--	--	--
Lakeshore	Oxide	--	1.00	1.00	(1.00)	(1.00)	--	--	--	--	--
Miami (5	Sulphide	0.58	0.58	0.58	0.53	0.55	0.60	0.54	--	--	--
	Oxide	--	--	--	--	0.50	0.49	0.57	0.59	0.52	0.49
Mineral Park (6	Sulphide	0.24	0.32	--	--	--	--	--	--	--	--
Sierrita (6	Sulphide	0.34	0.30	0.30	(0.30)	0.34	0.33	0.34	0.33	0.30	0.31
Twin Buttes (7	Sulphide	0.82	0.74	0.78	0.57	--	--	--	--	3.39	1.90
	Oxide	1.26	1.20	1.06	0.93	0.86	0.84	--	--	1.22	1.13
MAGMA COPPER COMPANY											
Pinto Valley	Sulphide	0.49	0.46	0.46	--	0.44	0.45	0.45	0.36	0.37	0.46
San Manuel	Sulphide	0.65	0.64	0.66	0.64	0.64	0.61	0.62	0.62	0.63	0.64
	Oxide	--	--	--	--	--	--	0.58	0.64	0.61	0.56
Superior	Sulphide	4.32	4.48	4.32	--	--	--	--	--	--	--

(continued)

TABLE VI (CONT'D)
AVERAGE COPPER CONTENT OF ORE PRODUCED AT ARIZONA COPPER MINES
(Percent Total Copper)

<u>MINE OPERATION</u>		<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
PHELPS DODGE CORPORATION											
Metcalf	Sulphide	0.69	--	0.78	--	--	--	--	--	--	--
Morenci (8	Sulphide	0.82	0.74	0.72	0.73	0.81	0.86	0.84	0.82	0.88	0.79
New Cornelia	Sulphide	0.51	0.50	0.64	0.60	0.55	--	--	--	--	--
WEIGHTED AVERAGE SULPHIDE GRADE		0.58	0.58	0.59	0.65	0.70	0.62	0.61	0.58	0.60	0.62

- () Percentage in parenthesis is approximate: Not used in calculation of weighted average.
- (1 Combined as Mission Complex in 1985.
- (2 Ray Unit acquired from Kennecott, November 18, 1986.
- (3 Grade reported for Ray Unit is an average of oxide and sulphide together though 1982.
- (4 Bluebird property acquired by Inspiration in 1984 and by Cyprus as part of Cyprus Miami, March 1988.
- (5 Acquired from Inspiration, July 1, 1988.
- (6 Sierrita, Esperanza and Mineral Park acquired from Duval Corp., April 1, 1986.
- (7 Included ANAMAX share of Palo Verde deposit for 1979-1982. Acquired by Cyprus, March 1988.
- (8 Combined Metcalf and Morenci mines production in 1983 et seq.
- (9 Weighted average grade of ore milled, based generally on an assay of total copper.

Source: Company annual reports, Form 10-K's and Prospectus: Personal correspondence and Arizona Department of Mines and Mineral Resources.

TABLE VII
PERCENT CONTAINED COPPER RECOVERED AT ARIZONA COPPER MINES
(Percent of Total Copper)

<u>MINE OPERATION</u>		<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
ASARCO INCORPORATED											
Mission (1	Sulphide	87	94	85	80 (80 est)		92	91	89	87	84
Pima (1	Sulphide	84	76	89	--	--	--	--	--	--	--
Ray (2	Sulphide	--	70	70 (70 est)		83	81	82	84	83	81
San Xavier (1	Sulphide	66	76	78	79 (80 est)		--	--	--	--	79
CYPRUS MINES CORPORATION											
Bagdad	Sulphide	76	94	83	83	92	91	93	90	91	84
	Oxide	--	--	--	--	52	51	54	42	46	90
Bluebird (3 (4	Oxide	41	156	--	--	--	--	--	--	--	--
Christmas (OP) (6	Sulphide	70	71	--	--	--	--	--	--	--	--
Esperanza (5	Sulphide	90	87	--	--	--	--	--	--	--	--
Johnson	Oxide	86	86	--	62 (62 est)		--	--	--	--	--
Miami (7	Sulphide	81	74	68	86	80	76	66	69	N/A	93
Mineral Park (5	Sulphide	84	75	--	--	--	--	--	--	--	--
Sierrita (5	Sulphide	86	80	98 (?) (88 est)		89	92	91	89	87	86
Twin Buttes (8	Sulphide	87	85	--	--	--	--	--	--	87	83
	Oxide	76	77	87 (80 est)		80 (80 est)	--	--	--	--	72
MAGMA COPPER COMPANY											
Pinto Valley	Sulphide	83	94	95	--	88	80	84	82	84	82
San Manuel	Sulphide	95	87	89	86	90	90	90	85	86	82
Superior	Sulphide	95	93 (93 est)	--	--	--	--	--	--	--	--
PHELPS DODGE CORP.											
Metcalf	Sulphide	58	--	--	--	--	--	--	--	--	--
Morenci (9	Sulphide	64	69	68	71	70	86	76	74	72	73
New Cornelia	Sulphide	79	78	85	78	76	--	--	--	--	--

TABLE VII (CONT'D)
PERCENT CONTAINED COPPER RECOVERED AT ARIZONA COPPER MINES
(Percent of Total Copper)

- (1) Combined as Mission Complex in 1985.
- (2) Ray Unit acquired from Kennecott, November 18, 1986.
- (3) Bluebird property acquired by Inspiration in 1984 and by Cyprus as part of Cyprus Miami, July 1, 1988.
- (4) Recovery by leaching heaps continued after mining was terminated in July 1981.
- (5) Sierrita, Esperanza, and Mineral Park acquired from Duval Corp., April 1, 1987.
- (6) Acquired from Inspiration, July 1, 1988.
- (7) Percent recovery by leaching since 1986. Acquired from Inspiration, July 1, 1988.
- (8) Recovery includes ANAMAX's share of Palo Verde 1981-1982-1983-1984. Acquired by Cyprus in March, 1989.
- (9) Includes Metcalf production since 1981.

TABLE VIII

STRIPPING RATIOS AT ARIZONA OPEN-PIT COPPER MINES (1)

(Waste:Ore)

<u>MINE OPERATION</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
ASARCO INCORPORATED										
Eisenhower (2 (3	--	0.71:1	0.67:1	0.57:1	1.26:1	--	--	--	--	--
Mission (3	3.05:1	2.01:1	1.62:1	2.52:1	1.32:1	0.74:1	0.84:1	1.05:1	2.02:1	1.41:1
Pima (3	6.28:1	3.06:1	1.42:1	--	--	--	--	--	--	--
Ray (4	3.15:1	1.88:1	2.30:1	2.72:1	2.11:1	2.27:1	2.12:1	1.99:1	2.10:1	1.70:1
Sacaton	2.02:1	1.30:1	0.70:1	0.35:1	0.10:1	--	--	--	--	--
San Xavier (3	6.01:1	6.18:1	2.90:1	0.96:1	1.97:1	--	--	--	--	6.72:1
Silver Bell	--	1.41:1	--	1.09:1	1.17:1	--	--	--	--	--
CYPRUS MINES CORPORATION										
Bagdad	1.52:1	1.78:1	1.45:1	1.53:1	0.94:1	0.42:1	0.54:1	0.77:1	1.96:1	1.23:1
Bluebird (5 (6	1.50:1	0.003:1	--	--	--	--	--	--	--	--
Christmas (7	4.40:1	3.24:1	--	--	--	--	--	--	--	--
Esperanza (8	0.76:1	1.95:1	--	--	--	--	--	--	--	--
Johnson	2.01:1	1.52:1	--	0.03:1	--	--	--	--	--	--
Miami (7	2.40:1	1.53:1	1.42:1	0.27:1	1.72:1	1.50:1	1.82:1	2.04:1	2.01:1	0.96:1
Mineral Park (8	1.71:1	1.44:1	--	--	--	--	--	--	--	--
Sierrita (8	1.11:1	0.98:1	0.55:1	0.33:1	0.76:1	0.55:1	0.19:1	0.40:1	0.67:1	0.77:1
Twin Buttes (9	3.32:1	3.62:1	2.05:1	1.14:1	--	--	--	--	34.60:1	8.37:1
MAGMA										
San Manuel Oxide	--	--	--	--	--	--	1.70:1	2.46:1	2.32:1	2.45:1
Pinto Valley	1.07:1	1.77:1	1.80:1	--	0.79:1	1.01:1	1.21:1	1.32:1	1.39:1	1.53:1
PHELPS DODGE CORPORATION										
Metcalf	1.67:1	--	--	--	--	--	--	--	--	--
Morenci (10	1.30:1	1.63:1	0.79:1	0.64:1	0.90:1	0.68:1	0.76:1	1.10:1	1.13:1	1.22:1
New Cornelia	2.27:1	0.48:1	1.21:1	0.30:1	0.58:1	--	--	--	--	--
WEIGHTED AVERAGE*	1.90:1	1.57:1	1.31:1	0.57:1	1.10:1	0.88:1	0.96:1	1.21:1	1.49:1	1.46:1

TABLE VIII (CONT'D)
STRIPPING RATIOS AT ARIZONA OPEN-PIT COPPER MINES (1
(Waste:Ore)

- (1) Leachable rock included with waste (except at solely leach operations).
- (2) Mining was done by ASARCO, includes ANAMAX's share of ore.
- (3) Combined as Mission Complex in 1985.
- (4) Ray Unit acquired from Kennecott, November 18, 1986.
- (5) Stripping of overburden ceased in January 1981, but mining continued until July.
- (6) Bluebird Property acquired by Inspiration in 1984 and by Cyprus as part of Cyprus Miami, July 1, 1988.
- (7) Acquired from Inspiration, July 1, 1988.
- (8) Sierrita, Esperanza and Mineral Park acquired from Duval, April 1, 1986.
- (9) Acquired by Cyprus, March, 1988.
- (10) Combined Morenci and Metcalf 1981 et. seq.

Source: "Minerals Yearbook - Area Reports: Domestic", U.S. Bureau of Mines; Company Annual Reports; E&MJ International Directory of Mining and Mineral Processing Operations; Arizona Department of Mines & Mineral Resources; Company submitted data beginning in 1985.

*NOTE: These are now weighted averages so use caution in making comparisons to the averages presented in previous editions of this report prior to 1981.